

AMENDMENTS TO THE CLAIMS

1. (Previously Presented): A method of crystallizing amorphous silicon, comprising:
depositing an inducing substance for silicon crystallization on an exposed surface of an amorphous silicon layer by plasma exposure; and
annealing the amorphous silicon layer,
wherein the annealing is carried out for less than about 50 minutes.
2. (Previously Presented): A method of crystallizing amorphous silicon, comprising:
providing a substrate on which an amorphous silicon layer is formed;
depositing an inducing substance for silicon crystallization on an exposed surface of an amorphous silicon layer by plasma exposure; and
annealing the amorphous silicon layer,
wherein the annealing is carried out for less than about 50 minutes.
3. (Original): The method of claim 2, wherein the substrate is prepared by forming the amorphous silicon layer on an isolated substrate.
4. (Original): The method of claim 3, wherein a buffer layer is formed between the isolated substrate and the amorphous silicon layer.
5. (Original): The method of claim 2, the method further comprising the step of forming a second amorphous silicon layer after the plasma exposure.
6. (Original): The method of claim 2, the method further comprising the step of selectively forming an insulating layer on the substrate before the step of depositing an inducing substance for silicon crystallization.
7. (Original): The method of claim 1, wherein the plasma is RF plasma.
8. (Original): The method of claim 1, wherein the plasma is a DC plasma.
9. (Original): The method of claim 1, wherein the plasma is microwave plasma.

10. (Original): The method of claim 1, wherein temperature of the annealing ranges about 300° to 1000° C.

11. (Previously Presented): The method of claim 1, wherein the inducing substance for silicon crystallization is a transition metal.

12. (Previously Presented): The method of claim 1, wherein the inducing substance for silicon crystallization is a noble metal.

13. (Original): The method of claim 11, wherein the transition metal is Ni.

14-16. (Canceled):

17. (Previously Presented): The method of claim 46, wherein the substrate is prepared by forming a buffer layer on an insulated substrate and by forming the amorphous silicon layer on the buffer layer.

18. (Previously Presented): The method of claim 46, the method further comprising forming a second amorphous silicon layer after the exposure of the amorphous silicon layer to the atoms of the inducing substance.

19. (Previously Presented): The method of claim 46, the method further comprising selectively forming an insulating layer on the substrate before exposure of the amorphous silicon layer to the atoms of the inducing substance.

20-21. (Canceled):

22. (Previously Presented): A crystallizing apparatus, comprising:
a chamber having inner space;
a substrate support arranged in the chamber, the substrate support being used for supporting a substrate having an amorphous silicon layer formed thereon;

a plasma generating device having a metal source connected to a power supply, the plasma generating device producing plasma inside the chamber by supplying the metal bar with RF or DC power from the power supply to deposit a crystallization catalyst on an exposed surface of the amorphous silicon layer;

a heater arranged at the substrate support, the heater supplying the substrate with heat for performing crystallization while the plasma generating device produces plasma inside the chamber,

wherein the performing crystallization is carried out for less than about 50 minutes.

23. (Canceled):

24. (Original): The crystallizing apparatus according to claim 22, wherein the chamber has a gas inlet through which gas as a plasma source is provided to the chamber.

25. (Original): The crystallizing apparatus according to claim 22, wherein the chamber has an outlet for exhausting fluid.

26. (Canceled):

27. (Previously Presented): The method of claim 1, wherein the annealing is carried out for less than about 10-20 minutes.

28. (Canceled):

29. (Previously Presented): The method of claim 2, wherein the annealing is carried out for about 10-20 minutes.

30. (Previously Presented): The method of claim 1, wherein the annealing is carried out in presence of a plasma.

31. (Previously Presented): The method of claim 2, wherein substantially the entire amorphous silicon layer is crystallized in less than about one hour.

32. (Previously Presented): The method of claim 2, substantially the entire amorphous silicon is crystallized in less than 50 minutes.
33. (Previously Presented): The method of claim 2, wherein substantially the entire amorphous silicon is crystallized in about 10 minutes.
34. (Previously Presented): The method of claim 2, wherein the depositing and the annealing are carried out in one chamber.
35. (Previously Presented): The method of claim 2, wherein the annealing is carried out in presence of a plasma.
36. (Previously Presented): The method of claim 46 wherein substantially the entire amorphous silicon layer is crystallized in less than four hours.
37. (Previously Presented): The method of claim 46, wherein substantially the entire amorphous silicon layer is crystallized in less than 50 minutes.
38. (Previously Presented): The method of claim 46, wherein substantially the entire amorphous silicon layer is crystallized in about 10 minutes.
39. (Previously Presented): The method of claim 46, wherein substantially the inducing substance is deposited on an exposed surface of the amorphous silicon layer.
40. (Previously Presented): The method of claim 46, wherein the exposing and the annealing are carried out in one chamber.
41. (Previously Presented): The crystallizing apparatus according to claim 22, wherein the heat supplied by the heater is in a range from 300 °C to 1000 °C.
42. (Currently Amended): A method of crystallizing amorphous silicon, comprising:
providing a substrate on which an amorphous silicon layer is formed;

distributing atoms of a inducing substance for a silicon crystallization surrounding an amorphous silicon layer by plasma;

exposing the amorphous silicon layer to the atoms of the inducing substance; and

annealing the amorphous silicon layer, wherein the annealing is carried out for less than about 50 minutes.

43. (Canceled):

44. (Previously Presented): The method of claim 42, wherein the annealing is carried out for about 10-20 minutes.

45. (Previously Presented): A crystallizing apparatus, comprising:

a chamber having inner space;

a plasma generating device having a metal source connected to a power supply, the plasma generating device producing plasma inside the chamber by supplying the metal bar with RF or DC power from the power supply to deposit a crystallization catalyst on an exposed surface of the amorphous silicon layer;

a substrate support arranged in the chamber, the substrate support being used for supporting a substrate having an amorphous silicon layer formed thereon, the substrate being isolated from the power supply; and

a heater arranged at the substrate support, the heater supplying the substrate with heat for performing crystallization while the plasma generating device produces plasma inside the chamber.

46. (Currently Amended): A method of crystallizing amorphous silicon, comprising:

providing a substrate on which an amorphous silicon layer is formed;

distributing atoms of a inducing substance for a silicon crystallization surrounding an amorphous silicon layer by plasma;

exposing the amorphous silicon layer to the atoms of the inducing substance while annealing the amorphous silicon layer, wherein the annealing is carried out for less than about 50 minutes.

47. (Previously Presented): A method of crystallizing amorphous silicon, comprising:

- providing a substrate on which an amorphous silicon layer is formed;
- depositing an inducing substance for silicon crystallization on an exposed surface of the amorphous silicon layer by plasma exposure; and
- annealing the substrate where the inducing substance is deposited, wherein the inducing substance deposited is in continuous and direct contact with the amorphous silicon layer.

48. (Previously Presented): A method for manufacturing a semiconductor device having a poly-crystalline silicon layer, the method comprising:

- providing a substrate having an amorphous silicon layer;
- depositing a metal inducing substance on the amorphous silicon layer using a plasma generating equipment having an electrode, the electrode of the plasma generating equipment including the metal inducing substance;
- separating the metal inducing substance from the electrode of the plasma generating equipment;
- depositing a layer for the semiconductor device on the metal inducing substance using the plasma generating equipment without exposing the substrate to an external atmosphere; and
- annealing the amorphous silicon layer to crystallize the amorphous silicon layer.